

4th

5th

6th

7th

8th



meapTM
Michigan Educational Assessment Program

Item Descriptors



MATHEMATICS
FALL 2012

**MICHIGAN STATE BOARD OF EDUCATION
STATEMENT OF ASSURANCE OF COMPLIANCE WITH FEDERAL LAW**

The Michigan State Board of Education complies with all Federal laws and regulations prohibiting discrimination and with all requirements and regulations of the U.S. Department of Education. It is the policy of the Michigan State Board of Education that no person on the basis of race, color, religion, national origin or ancestry, age, sex, marital status, or handicap shall be discriminated against, excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination in any program or activity for which it is responsible or for which it receives financial assistance from the U.S. Department of Education.

NOTE: For each item listed throughout this booklet, the first statement is a summary of the Michigan Grade Level Content Expectation (GLCE) and the second statement is the descriptor for the item's stem or question.

Copyright© 2012, by the Michigan Department of Education.

All rights reserved. No part of this publication may be reproduced or transmitted, in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the Michigan Department of Education.

Portions of this work were previously published.

Printed in the United States of America.

Students were instructed to read the directions below silently as the test administrator read them aloud.

PART 1

DIRECTIONS:

In this part, you will answer multiple-choice mathematics questions. Some questions will ask you to view a picture, chart, or other mathematics-related information. Use that information with what you know to answer the question. You may **NOT** use a calculator for this part of the test.

You must mark all of your answers in Part 1 of your **Answer Document** with a No. 2 pencil. You may underline, circle, or write in this test booklet to help you, but nothing marked in this test booklet will be scored. No additional paper may be used.

Mark only one answer for each question. Completely fill in the corresponding circle on your **Answer Document**. If you erase an answer, be sure to erase completely. Remember that if you skip a question in the test booklet, you need to skip the answer space for that question on the **Answer Document**. If you are not sure of an answer, mark your **best** choice.

A sample question is provided for you below.

Sample Multiple-Choice Question:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the **least** number of cases that Marty will need to hold all his CDs?

- A** 8
- B** 9
- C** 10
- D** 11

For this sample question, the correct answer is **C**. Circle **C** is filled in for the sample question on your **Answer Document**.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page. If you finish early, you may go back and check your work in Part 1 of the test **ONLY**. Check to make sure that you have answered every question. Do **NOT** look at any other part of the test.

NOTE: The directions for Part 2 are the same as the above instructions, but with calculators allowed.

- 1 N.MR.06.01:** Understand division of fractions as the inverse of multiplication, e.g., if $4/5$ divided by $2/3 = \text{box}$, then $2/3 \text{ times box} = 4/5$, so $\text{box} = 4/5 \text{ times } 3/2 = 12/10$.

Identify the equivalent expression to the given division expression.

- A** $a/b \div c/d = b/a \times c/d$
- B** correct
- C** $a/b \div c/d = b/a \div d/c$
- D** $a/b \div c/d = a/b \div d/c$

- 2 N.MR.06.01:** Understand division of fractions as the inverse of multiplication, e.g., if $4/5$ divided by $2/3 = \text{box}$, then $2/3 \text{ times box} = 4/5$, so $\text{box} = 4/5 \text{ times } 3/2 = 12/10$.

Multiply two fractions.

- A** added numerators, multiplied denominators
- B** correct
- C** multiplied numerators, added denominators
- D** $a/b \times c/d = (a \times d)/(b \times c)$

- 3 N.FL.06.02:** Given an applied situation involving dividing fractions, write a mathematical statement to represent the situation.

Identify expression that corresponds to given context.

- A** multiplied instead of divided
- B** correct
- C** divisor \div dividend
- D** reciprocal of dividend \div divisor

- 4 N.FL.06.02:** Given an applied situation involving dividing fractions, write a mathematical statement to represent the situation.

Identify expression that corresponds to given context.

- A** multiplied instead of divided
- B** correct
- C** added instead of divided
- D** subtracted instead of divided

- 5 N.MR.06.03:** Solve for the unknown in equations such as: $1/4$ divided by $\text{box} = 1$, $3/4$ divided by $\text{box} = 1/4$, and $1/2 = 1 \text{ times box}$.

Solve for variable in linear equation.

- A** reciprocal
- B** subtracted coefficient from constant
- C** constant
- D** correct

- 6 N.ME.06.20:** Know that the absolute value of a number is the value of the number, ignoring the sign; or is the distance of the number from 0.

Determine value of negative number.

- A** given negative number
- B** incorrect value
- C** correct
- D** square of given number

- 7 N.FL.06.04:** Multiply and divide any two fractions, including mixed numbers, fluently.

Multiply two fractions.

- A** correct
- B** added numerators, multiplied denominators
- C** multiplied numerators, added denominators
- D** added numerators and denominators

- 8 N.FL.06.04:** Multiply and divide any two fractions, including mixed numbers, fluently.

Multiply fraction by mixed number.

- A** added
- B** added whole number of mixed number to difference of fractions
- C** correct
- D** $a/b \times c/d = (a \times d)/(c \times d)$

- 9 N.ME.06.07:** Understand that a fraction or a negative fraction is a quotient of two integers, e.g., $-8/3$ is -8 divided by 3 .

Translate fraction into division expression.

- A** addition expression
- B** multiplication expression
- C** subtraction expression
- D** correct

- 10 N.MR.06.01:** Understand division of fractions as the inverse of multiplication, e.g., if $4/5$ divided by $2/3 = \text{box}$, then $2/3 \text{ times box} = 4/5$, so $\text{box} = 4/5 \text{ times } 3/2 = 12/10$.

Identify equivalent operation to dividing by a fraction.

- A** dividing number by $a/b = \text{adding } b/a \text{ to the number}$
- B** dividing number by $a/b = \text{subtracting } b/a \text{ from the number}$
- C** correct
- D** dividing number by $a/b = \text{dividing the number by } b/a$

- 11 N.FL.06.09:** Add and multiply integers between -10 and 10; subtract and divide integers using the related facts. Use the number line and chip models for addition and subtraction.

Subtract integers.

- A** correct
- B** $-b - a = -b + a$
- C** $-b - a = b - a$
- D** $-b - a = b + a$

- 12 N.FL.06.09:** Add and multiply integers between -10 and 10; subtract and divide integers using the related facts. Use the number line and chip models for addition and subtraction.

Multiply two negative integers.

- A** $-a(-b) = -a \times b$
- B** $-a(-b) = -a + -b$
- C** $-a(-b) = a + b$
- D** correct

- 13 N.FL.06.10:** Add, subtract, multiply and divide positive rational numbers fluently.

Add mixed number to fraction.

- A** added whole number to product of fractions
- B** added numerators, multiplied denominators
- C** added numerators and denominators
- D** correct

- 14 N.FL.06.10:** Add, subtract, multiply and divide positive rational numbers fluently.

Multiply fractions.

- A** added numerators, multiplied denominators
- B** correct
- C** added numerators and denominators
- D** $a/b \times c/d = (a \times d)/(b \times c)$

- 15 N.FL.06.12:** Calculate part of a number given the percentage and the number.

Calculate percentage of number.

- A** correct
- B** $ab\% \text{ of } cd = ab$
- C** $ab\% \text{ of } cd = cd - ab$
- D** $ab\% \text{ of } cd = (ab\% \text{ of } cd) + cd$

- 16 N.FL.06.10:** Add, subtract, multiply and divide positive rational numbers fluently.

Divide fraction by another fraction.

- A** multiplied
- B** $a/b \div c/d = (b \times c)/(a \times d)$
- C** correct
- D** $a/b \div c/d = d/c$

- 17 N.ME.06.17:** Locate negative rational numbers (including integers) on the number line; know that numbers and their negatives add to 0, and are on opposite sides and at equal distance from 0 on a number line.

Locate negative mixed number on number line.

- A** correct
- B** location of number one more than given number
- C** location of absolute value of number minus 1
- D** location of absolute value of number

- 18 N.ME.06.18:** Understand that rational numbers are quotients of integers (non-zero denominators), e.g., a rational number is either a fraction or a negative fraction.

Identify number type.

- A** incorrect type of number
- B** incorrect type of number
- C** correct
- D** incorrect type of number

- 19 N.ME.06.17:** Locate negative rational numbers (including integers) on the number line; know that numbers and their negatives add to 0, and are on opposite sides and at equal distance from 0 on a number line.

Solve for variable in linear equation.

- A** correct
- B** reciprocal
- C** given constant
- D** additive identity

- 20 N.ME.06.20:** Know that the absolute value of a number is the value of the number, ignoring the sign; or is the distance of the number from 0.

Identify number equivalent to negative integer.

- A** $-a = |-a|$
- B** $-a = |a|$
- C** correct
- D** $-a = -(-a)$

- 21 N.MR.06.03:** Solve for the unknown in equations such as: $1/4$ divided by box = 1, $3/4$ divided by box = $1/4$, and $1/2 = 1$ times box.

Solve division equation.

- A** square of correct divisor
- B** correct
- C** given constant
- D** reciprocal

- 22 A.RP.06.02:** Plot ordered pairs of integers and use ordered pairs of integers to identify points in all four quadrants of the coordinate plane.

Locate point on coordinate grid.

- A** $(-x, -y) = (-x, y)$
- B** $(-x, -y) = (x, y)$
- C** $(-x, -y) = (x, -y)$
- D** correct

- 23 A.FO.06.03:** Use letters, with units, to represent quantities in a variety of contexts, e.g., y lbs., k minutes, x cookies.

Translate text into algebraic expression.

- A** $a - bx = bx$
- B** $a - bx = ax$
- C** correct
- D** $a - bx = b - ax$

- 24 A.FO.06.03:** Use letters, with units, to represent quantities in a variety of contexts, e.g., y lbs., k minutes, x cookies.

Translate text into algebraic expression.

- A** correct
- B** subtracted instead of multiplied
- C** added instead of multiplied
- D** divided instead of multiplied

- 25 A.FO.06.05:** Use standard conventions for writing algebraic expressions, e.g., $2x + 1$ means “two times x , plus 1” and $2(x + 1)$ means “two times the quantity $(x + 1)$ ”.

Translate combination of text and algebraic expression into algebraic expression.

- A** $ax + (bx - c) = a + (bx - c)$
- B** $ax + (bx - c) = ax(bx - c)$
- C** correct
- D** $ax + (bx - c) = a + x + (bx - c)$

- 26 A.FO.06.04:** Distinguish between an algebraic expression and an equation.

Identify algebraic equation.

- A** algebraic expression
- B** algebraic inequality
- C** algebraic expression
- D** correct

- 27 A.FO.06.05:** Use standard conventions for writing algebraic expressions, e.g., $2x + 1$ means “two times x , plus 1” and $2(x + 1)$ means “two times the quantity $(x + 1)$ ”.

Translate text into algebraic expression.

- A** correct
- B** $x/a + b = a(x + b)$
- C** $x/a + b = ax + b$
- D** $x/a + b = (x + b)/a$

- 28 A.FO.06.05:** Use standard conventions for writing algebraic expressions, e.g., $2x + 1$ means “two times x , plus 1” and $2(x + 1)$ means “two times the quantity $(x + 1)$ ”.

Translate algebraic expression into text.

- A** correct
- B** ax means division
- C** ax means subtraction
- D** ax means addition

- 29 A.FO.06.11:** Relate simple linear equations with integer coefficients, e.g., $3x = 8$ or $x + 5 = 10$, to particular contexts and solve.

Solve contextualized algebraic equation.

- A** correct
- B** subtracted factor from product
- C** added factor to product
- D** twice given product

- 30 A.FO.06.11:** Relate simple linear equations with integer coefficients, e.g., $3x = 8$ or $x + 5 = 10$, to particular contexts and solve.

Solve contextualized algebraic equation.

- A** correct
- B** incorrect factor - over by 1
- C** subtracted factor from product
- D** added factor to product

- 31 A.FO.06.12:** Understand that adding or subtracting the same number to both sides of an equation creates a new equation that has the same solution.

Identify linear equation with same solution as given linear equation.

- A** added constant to one side of equation
- B** changed from subtraction to addition, same constant on other side
- C** added constant to one side of equation, same constant on other side
- D** correct

- 32 A.FO.06.12:** Understand that adding or subtracting the same number to both sides of an equation creates a new equation that has the same solution.

Identify linear equation with same solution as given linear equation.

- A** correct
- B** added constant to one side of equation and subtracted same constant from other side
- C** added constant to one side of equation and variable to other side of equation
- D** added constant to one side of equation and subtracted same constant from other side

- 33 A.FO.06.03:** Use letters, with units, to represent quantities in a variety of contexts, e.g., y lbs., k minutes, x cookies.

Translate text into algebraic expression.

- A** added instead of multiplied
- B** subtracted instead of multiplied
- C** divided instead of multiplied
- D** correct

- 34 A.FO.06.13:** Understand that multiplying or dividing both sides of an equation by the same non-zero number creates a new equation that has the same solution.

Identify linear equation equivalent to given linear equation.

- A** correct
- B** subtracted constant from one side of equation and added same constant to other side
- C** divided one side of equation by constant
- D** divided one side of equation by constant and divided other side by same constant

- 35 M.PS.06.02:** Draw patterns (of faces) for a cube and rectangular prism that, when cut, will cover the solid exactly (nets).

Identify 3-D solid given its net.

- A** incorrect 3-D shape
- B** correct
- C** incorrect 3-D shape
- D** incorrect 3-D shape

- 36 A.FO.06.06:** Represent information given in words using algebraic expressions and equations.

Translate text into algebraic expression.

- A** subtracted instead of multiplied
- B** added instead of multiplied
- C** put variable with constant
- D** correct

- 37 A.FO.06.06:** Represent information given in words using algebraic expressions and equations.

Identify equation that represents time needed to save for a computer.

- A** expression, part of correct equation
- B** correct
- C** addition expression
- D** added instead of multiplied

- 38 A.FO.06.07:** Simplify expressions of the first degree by combining like terms, and evaluate using specific values.

Evaluate algebraic expression give value of variable.

- A** value of variable
- B** value of coefficient after adding variables
- C** value of coefficient after adding variables + value of variable
- D** correct

- 39 A.FO.06.07:** Simplify expressions of the first degree by combining like terms, and evaluate using specific values.

Evaluate an expression given the values of x and y.

- A** used value of y throughout expression
- B** correct
- C** transposed x and y values
- D** used value of x throughout expression

- 40 A.FO.06.14:** Solve equations of the form $ax + b = c$, e.g., $3x + 8 = 15$ by hand for positive integer coefficients less than 20, use calculators otherwise, and interpret the results.

$$ax + b = c$$

- A** correct
- B** $a + b$
- C** $c - b$
- D** $b + c$

- 41 A.FO.06.14:** Solve equations of the form $ax + b = c$, e.g., $3x + 8 = 15$ by hand for positive integer coefficients less than 20, use calculators otherwise, and interpret the results.

$$ax - b = c$$

- A** incorrect value
- B** subtracted b from each side, instead of added
- C** a
- D** correct

- 42 A.PA.06.01:** Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in $3\frac{1}{2}$ hours?

Determine total number of books read given rate.

- A** total number of weeks divided by product of numbers in given rate
- B** total number of weeks - number of weeks given in rate
- C** total number of weeks
- D** correct

- 43 A.PA.06.01:** Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in $3\frac{1}{2}$ hours?

Calculate the total number of miles walked given the rate.

- A** number of miles given in rate
- B** number of miles given in rate + number of total hours
- C** $a.b \text{ miles/hour} \times c \text{ hours} = (a \times c).b \text{ miles}$
- D** correct

- 44 A.PA.06.09:** Solve problems involving linear functions whose input values are integers; write the equation; graph the resulting ordered pairs of integers, e.g., given c chairs, the “leg function” is $4c$; if you have 5 chairs, how many legs?: if you have 12 legs, how many chairs?

Use equation to find the cost of given number of baseball caps.

- A** number of baseball caps - cost per baseball cap
- B** number of baseball caps + cost per baseball cap
- C** cost per baseball cap \times cost per baseball cap
- D** correct

- 45 A.PA.06.09:** Solve problems involving linear functions whose input values are integers; write the equation; graph the resulting ordered pairs of integers, e.g., given c chairs, the “leg function” is $4c$; if you have 5 chairs, how many legs?: if you have 12 legs, how many chairs?

Use equation to find greatest number of gummy treats that can be purchased.

- A** correct
- B** total spent - cost per gummy bear
- C** total spent - cost per gummy bear - 1
- D** greatest value of options

- 46 A.RP.06.08:** Understand that graphs and tables can suggest relationships between quantities.

Match equation to given graph.

- A** graph of $y = mx$ equals $y = m + x$
- B** graph of $y = mx$ equals $x = my$
- C** graph of $y = mx$ equals $x = m + y$
- D** correct

- 47 A.RP.06.08:** Understand that graphs and tables can suggest relationships between quantities.

Match equation to given table.

- A** graph of $y = mx$ equals $x = my$
- B** correct
- C** graph of $y = mx$ equals $x + y = m$
- D** graph of $y = mx$ equals $xy = m$

- 48 A.RP.06.10:** Represent simple relationships between quantities, e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches; use verbal descriptions, formulas or equations, tables, and graphs.

Match equation to the given table.

- A** correct
- B** graph of $d = mt$ equals $t = md$
- C** graph of $d = mt$ equals $d = m + t$
- D** graph of $d = mt$ equals $t = m + d$

- 49 A.RP.06.10:** Represent simple relationships between quantities, e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches; use verbal descriptions, formulas or equations, tables, and graphs.

Identify table that shows given relationship between units of measure.

- A** $x = my$ instead of $y = mx$
- B** $y = x + 3$ instead of $y = mx$
- C** $x = my$ instead of $y = mx$ (with 2 different values than in option A)
- D** correct

- 50 M.TE.06.03:** Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.

Calculate volume of cube given the side length and formula.

- A** $3 \times$ side length
- B** correct
- C** 3 to the side length power
- D** surface area

- 51 N.MR.06.13:** Solve contextual problems involving percentages such as sales taxes and tips.

Calculate tip.

- A** one-third of correct tip
- B** correct tip rounded down to nearest dollar
- C** correct
- D** one-third more than correct tip

- 52 M.UN.06.01:** Convert between basic units of measurement within a single measurement system, e.g., square inches to square feet.

Convert square feet to square inches.

- A** 1 square foot = 12 square inches
- B** incorrect conversion
- C** number of feet squared $\times 12$
- D** correct

- 53 M.UN.06.01:** Convert between basic units of measurement within a single measurement system, e.g., square inches to square feet.

Convert days to minutes.

- A** 1 hour = 100 minutes
- B** correct
- C** 1 day = 12 hours
- D** 1 hour = 24 minutes

- 54 N.FL.06.14:** For applied situations, estimate the answers to calculations involving operations with rational numbers.

Estimate number of gallons used given distance and miles per gallon.

- A** estimate of miles/gallons
- B** correct
- C** estimate of miles per gallon
- D** estimate of distance + miles per gallon

- 55 N.FL.06.14:** For applied situations, estimate the answers to calculations involving operations with rational numbers.

Estimate the number of cookies that can be made from more than one bag of cookie-dough mix.

- A** correct
- B** overestimate
- C** overestimate
- D** overestimate

- 56 N.FL.06.15:** Solve applied problems that use the four operations with appropriate decimal numbers.

Calculate total cost of ice cream cones.

- A** less than cost of one cone (not $\frac{1}{4}$ of cost)
- B** cost of one cone + number of cones
- C** number of cones \times dollar portion of cost of one cone plus cents portion
- D** correct

- 57 N.FL.06.15:** Solve applied problems that use the four operations with appropriate decimal numbers.

Estimate amount deposited in savings account per week given percent and amount earned.

- A** correct
- B** twice correct estimate
- C** amount earned per week - percent deposited
- D** $ab.c\% = a.bc$

- 58 N.ME.06.05:** Order rational numbers and place them on the number line.

Order decimals in tenths and hundredths from least to greatest.

- A** greatest to least
- B** mixed order
- C** mixed order
- D** correct

- 59 N.ME.06.06:** Represent rational numbers as fractions or terminating decimals when possible, and translate between these representations.

Translate fraction to decimal.

- A** $a/b = 0.a$
- B** $a/b = 0.b$
- C** correct
- D** $a/b = a.b$

- 60 N.ME.06.11:** Find equivalent ratios by scaling up or scaling down.

Determine equivalent fraction.

- A** $a/b = 2a/3b$
- B** correct
- C** $a/b = (a + 1)/(b + 1)$
- D** reciprocal

- 61 N.ME.06.11:** Find equivalent ratios by scaling up or scaling down.

$a/b = x/c$ (a, b, c are given constants)

- A** a/b
- B** $c/(a \text{ times } b)$
- C** correct
- D** $a \text{ times } c$

- 62 M.TE.06.03:** Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.

Determine volume of rectangular prism.

- A** length + width + height
- B** half of volume
- C** correct
- D** surface area

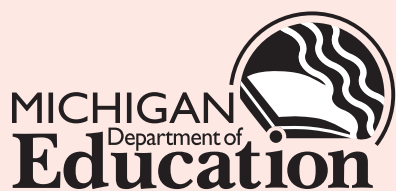
4th

5th

6th

7th

8th



Bureau of Assessment and Accountability (BAA)
Michigan Educational Assessment Program (MEAP)
Phone: 1-877-560-8378
Website: www.michigan.gov/meap
Email: baa@michigan.gov